upon various bacteria; in fatal diseases it sometimes loses part of its germicidal power for the colon bacillus shortly before death, but more frequently retains this power for several hours after death; human blood serum does not lose its germicidal power for typhoid and colon bacilli, even in the late stages of chronic wasting disease.

THE *Philadelphia Medical Journal*, which during its first year has secured a high position among medical journals, will hereafter publish a monthly supplement of 60 pages containing original articles.

SOCIETIES AND ACADEMIES.

NATIONAL GEOGRAPHIC SOCIETY, JANUARY 6, 1899.

Abstract.

'THE Work of Glaciers in High Mountains:' By Willard D. Johnson. The greater number of the imposing forms in the summit regions of nearly all high mountains are of unknown origin. They are, however, strictly confined to tracts which either have in the recent past been glaciated or are glaciated now. Presumably, therefore, they are of glacial origin. But the difficulty is that, according to the known laws of glacial erosion, they are unintelligible.

The recognized process in glacial erosion is scour. This process, like aqueous corrasion, must always tend—in uniformly resistant and unfractured material—to produce graded slopes. But in glaciated summit regions, especially in granite and in tracts of that rock which answer most nearly to ideal conditions of uniform hardness, the topography is essentially that of flat valley floors and of upright cliffs, transverse as well as longitudinal to the direction of flow. In sound rock both glacial scour and aqueous corrasion will be not only incompetent but inimical to the production of such forms.

An unrecognized process appears to be that of sapping. The transverse, and therefore buried, cliffs in the glacier's pathway, as well as the amphitheatral cliff at its head, are cliffs of recession. The action of scour is downward and outward with the glacial advance, but the action of sapping is horizontal and backward. It is seldom lateral, and then only for a brief space. The flat valley bottom, as well as the parallel valley walls (where subsequent scour has not dulled their upright profiles), are by-products of recession of the transverse cliff.

So long as, along any advancing line, it continues active, sapping will be altogether dominant over scour, accomplishing large results in excavation; but its action, apparently, is by successive attacks, from point to point, and has relatively brief duration. Its forms, thereafter, arrested in development, become obsolescent under the contiuous action of scour, and the rounding-off of angles puts them seemingly into the category of scour forms.

The following hypothesis is advanced as to the cause of glacial sapping: The glacier protects its bed against the sharp variations of temperature which, by mechanical disintegration, waste exposed slopes. At the same time the covered rock surface is maintained close to zero, Centigrade—a critical temperature. By tearing away at its head from the mountain slope, and by reason of initial irregularities of bed along its line of flow, the glacier is broken across. If the depth of ice be not too great these breaks, or crevasses, will penetrate to the bottom. Along the narrow transverse line of bed, or floor, thus exposed—during summer, while the crevasse is open—there will be oscillations of temperature, between day and night perhaps, accomplishing an alternation of freezing and thawing. This alternation across the freezing point, at the crevasse foot, will be much more frequent than upon the exposed slopes without—a diurnal, rather than a seasonal, change. The crevasse foot will thus be a line of sharply localized and abnormally vigorous weathering, by coarse mechanical disintegration. The glacier is an agent here, directly, only in the removal of waste products. Frost-fracturing acts vertically downward, as well as horizontally backward, into the cliff, which it thus undercuts; but the products of its downward work are much less readily removed, and failure to remove operates to defeat downward action. Thus the cliff recedes, leaving in its trail an approximately flat and horizontal floor. In the slight unevennesses of this floor, after glacial conditions have passed and the cañon has become emptied, rock-basin lakes accumulate.

By recession at the amphitheatre head—and the glacier makes the amphitheatre, rather than merely occupies it—the amphitheatral wall is carried backward, and divides are cut through. A summit region, upon either slope of which glacial streams are extended, will be trenched by streams heading thus in opposition. A first effect of the meeting of an opposing pair will be the arête, or thin comb—the most evanescent of mountain forms; the final effect will be the col—a low-level pass between walls. The ultimate result of continued glaciation must be truncation of the crest region, close to the lower level of the glacial generation. Transitional forms will be not only the arête and the col, but the aiguille, or minaret, the residual table, the cañon of diverted discharge, the cañon of Yosemite type, and the towering peak of Matterhorn type, against which divergent streams will burrow at their heads, scalloping its base, and maintaining its sinking summit as the sharp apex of a slender and fluted pyramid.

HARVARD UNIVERSITY: STUDENTS' GEOLOGICAL CLUB, DECEMBER 19, 1898.

UNDER the general title, 'Geological Results of the Recent Storm upon the Massachusetts Coast,' five members reported observations. Mr. R. B. Earle described results noted on the Winthrop and Beachmont shores. Winthrop Beach, usually sandy and of gentle slope, bore a series of gravel cusps, terminated on the seaward side by spits that pointed toward the southeast. Whenever these cusps were composed of coarse gravel they were high and near together; when of fine material they were low and far apart. In the Beachmont Bluff, at similar intervals, was a series of cavern-like undercuttings. A portion of the beach, below the Bluff, was covered with heaps of seaweed shaped into cuspate forms, but another portion was degraded to a depth of three feet.

Mr. A. W. G. Wilson visited the south shore from Windmill Point to Cohasset Harbor. At the former locality sand and gravel were thrown inland thirty feet. The railroad track that ran close to high-tide level, along the front of the drumlin upon which the town of Hull is located, was protected by a breakwater of granite and diorite blocks. From this breakwater, some blocks, which weigh approximately a ton or more, were moved back ten feet and raised between one and two feet. Nantasket Beach, in front of Strawberry Hill, was cut down four feet, and back in places twenty feet, for a distance along the beach of five hundred yards. Sections of sewer pipe thus revealed afforded a basis for measurement. At the southern end of Nantasket, where most of the wrecks were washed up, large quantities of *thoroughly rounded*, soft coal were imbedded in the beach sand to a depth of at least ten inches. A short distance east of Gun Rock, half a mile from Nantasket, some houses stand one hundred yards inland and from six to ten feet above normal high water level. Coarse gravel accumulated against these houses in heaps three feet high and buried a neighboring road between two and three feet deep. At Hull and in the region of Gun Rock, where a salt marsh and a pond, respectively, lay back of the beach, new, storm-built beaches have encroached upon the marsh and pond, in the form of well-marked series of gravel spits from one to five feet in height.

Mr. J. M. Boutwell offered three records of height of water. At Lynn Beach the position of pebbles and débris indicates the submergence of its Nahant end. At its Lynn end, according to the statement of an eye witness, the water rose over the road to a depth of three feet and swept completely across the beach. At Milton, in the Neponset River, a rod has been so placed that its top marks the height reached by the high tide of 1851. One eye witness states that during the recent storm the water rose to within three inches of the top of this rod; another affirms that he saw it rise over the top. At the Boston end of the West Boston bridge the water in the Charles River rose to within one inch of the street level. The tide predicted for November 27th was the normal high-tide, ten feet two inches at Boston. Had the storm passed at the time of spring-tide, about two days later, the water would have risen fully a foot higher. As it was, the concomitant effect of an imminent spring-tide, a strong, low pressure area and an onshore wind was to raise the water higher, at some points, than it was during the high tide of 1851. J.M. BOUTWELL,

Chairman.

ONONDAGA ACADEMY OF SCIENCE.

At the November meeting of the Academy Professor P. F. Schneider read a paper on 'Onondaga Whetstones,' giving a short history of the use of whetstones and comparing the various commercial stones. The Labrador stone is found at the southern border of the county and is manufactured in a nearby town. It makes an excellent 'table stone.' The Arkansas stone is also manufactured by the same company, the 60,000 pounds annually shipped here yielding about 20,000 pounds of the finished product.

At the December meeting of the Academy Professor Schneider spoke on 'Palæobotany of Onondaga County,' illustrating his remarks by about a dozen plant remains from the local Silurian and Devonian rocks.

Mrs. L. L. Goodrich spoke on 'Variations in *Trilliums*,' and exhibited specimens ranging from the typical *Trillium grandiflorum* through gradations of petioled leaved forms to extreme forms with purely radical leaves. In nearly all cases the petals were more or less marked with green, and various degrees of reduplication and suppression of floral parts were noted as common occurrences.

Dr. A. A. Tyler spoke on 'The Origin of Species Through Variations,' after which the topics of the evening were discussed by Dr. W. M. Beauchamp and Dr. Hargitt.

H. W. Britcher,
Corresponding Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis, of January 9, 1899, the following officers were declared elected for the current year: President, Edmund A. Engler; Vice-Presidents, Robert Moore, D. S. H. Smith; Recording Secretary, William Trelease; Corresponding Secretary, Joseph Grindon; Treasurer, Enno Sander; Librarian, G. Hambach; Curators, G. Hambach, Julius Hurter, Hermann von Schrenk; Directors, M. H. Post, Amand Ravold.

Mr. Hermann von Schrenk presented informally the results of a study of a sclerotium disease of beech roots which he had observed in southeastern New York during the past summer. The sclerotia, which were formed by the webbing together of rootlets by sterile mycelial threads, were stated by the speaker to have apparently no connection with the mycorrhiza of the beech. Mr. von Schrenck's remarks were illustrated by drawings and alcoholic and sectioned specimens.

William Trelease,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

SCIENCE AND POLITICS.

At the last biennial session of the Legislature of Kansas there was passed what is known as the State uniform text-book law. A commission was appointed whose duty it was to select the text-books of all grades used in the public schools of the State, which were to be furnished at a stipulated price to all pupils. No other texts than the one selected may be used by any school under pain of severe penalties. The law has now been in force for two years and these books are being used by several hundred thousand pupils. So far as I can learn, specialists or experts were not consulted in the choice of the texts. Wide latitude was given to the commission, the one important stipulation being that the books should be cheap! Protests have been made, but in vain—the books must be used in every case where prior contracts are not in force. Let us examine the wisdom of the Kansas Solons in one case; I am told that others are like it.

The text in Physiology used in all grammar grades is one by a C. L. Hoxie, whoever he may be. As he is the author of text-books in Physics, doubtless his name will be familiar to the physicists of the country! The work had the benefit of revision by two high-school teachers of St. Louis. The part they took in the revision ought certainly to elevate them from obscurity.

We can sympathize strongly in the introductory statement by the author that the "value of a thorough knowledge of physiology in all of its departments can scarcely be estimated. If one be well a knowledge of physiology will keep him so. If one be sick the same knowledge will enable him to regain that priceless treasure—good health." One must suspect